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EPA Contaminated Sediments News

National Sediment Contaminant Point Source Inventory

An integral component of the U.S. EPA's Office of Water's Contaminated Sediment Management Strategy is the identification of sources of sediment contaminants in the United States. EPA has recently developed a national inventory of sediment contaminant discharges from municipal, federal, and industrial point sources and has analyzed these releases to identify and rank chemicals, geographic areas, and industries of concern based on their potential to cause sediment contamination problems.

More than 20,000 individual records of point source releases (from the Toxic Release Inventory and Permit Compliance System) of 113 different chemicals are included in the analysis. Approximately 900 individual watersheds and 45 distinct industrial categories are represented.

The geographic regions receiving the greatest hazard-weighted point source releases are the Great Lakes and south Atlantic Gulf; California, the Mid-Atlantic, and New England regions also have high releases of sediment contaminants. The industrial categories producing the greatest volume of hazard-weighted releases are also included in the report.

The data from this study will be used in conjunction with sediment quality data from the National Sediment Inventory to identify the potential magnitude of contaminated sediment problems in the Nation's freshwater and estuarine ecosystems, identifying locations for further sediment testing, selecting chemicals and industries that may require additional regulation, and selecting facilities for possible enforcement action. The next phase of the overall source inventory project will be an evaluation of nonpoint sources of sediment contaminants. The results of this effort will be described in a Report to Congress in 1995.

For more information on the National Sediment Contaminant Point Source Inventory, contact Catherine Fox, EPA OST, at (202) 260-1327.

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Contaminated Sediment Activities Timeline

August 1-5. *Meeting on Water Quality Standards/Criteria and Related Programs.* Knoxville, TN. Contact Charlie MacPherson, Tetra Tech, at (703) 385-6000.

August 7-12. *Stormwater NPDES Related Monitoring Needs.* Crested Butte, CO. Contact Barbara Hickernell, Environmental Foundation, 345 E. 47th St., New York, NY 10017, (212) 705-7837.

September 7-9. *Year of the Coast: Innovations in Coastal Management.* Wilmington, NC. Contact Jordan McColl, Inc., (800) 258-6711.

September 27-29. *National Forum on Mercury in Fish.* New Orleans, LA. Contact Charlie MacPherson, Tetra Tech, at (703) 385-6000 to obtain a meeting announcement which contains a preliminary agenda and preregistration form, or Rick Hoffmann, EPA OST, at (202) 260-0642 for additional information. See related announcement in *CS News*.

October 31-November 3. *1994 International Hazardous Material Spills Conference.* Buffalo, NY. Contact Sarah Bauer at (202) 260-8247. See related announcement in *CS News*.

October 30-November 3. *15th Annual Meeting of the Society of Environmental Toxicology and Chemistry.* Denver, CO. Contact Bill Stubblefield, Program Chair, at (303) 493-8878.

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Regional Activities

Region 1

Fate of Contaminants in Massachusetts Bays and Effects on Living Resources

For many years, Boston was known as much for its polluted harbor as for its basketball team. While the Celtics are no longer among the NBA's best teams, levels of contaminants such as polycyclic aromatic hydrocarbons (PAHs) in Boston Harbor sediments are among the highest reported for all coastal sites in the United States. Sediment contamination by PAHs and polychlorinated biphenyls (PCBs) has been associated with a high incidence of liver lesions in Boston Harbor winter flounder populations. These contaminants are listed in the current advisory on consumption of tomalley from lobsters. Now, through improved wastewater treatment and the planned relocation of the Massachusetts Water Resources Authority (MWRA) outfall to a deeper site in Massachusetts Bay, Boston Harbor is becoming cleaner. But relocating the outfall will not solve all of Boston Harbor's or Massachusetts Bay's problems. The outfall is only one of many potential sources of contamination to the Bay.

This article will summarize some of the recent research funded by the Massachusetts Bays Program (MBP) and other agencies on the sources, transport, fate, and effects of PAHs in the Massachusetts Bays. Credit should go to scientists from UMass/Lowell, Massachusetts Institute of Technology, MWRA, the United States Geological Survey, and the Woods Hole Oceanographic Institution.

Overall, the sources of PAHs to the Bays include atmospheric deposition, sewage treatment plants, and rivers such as the Charles and Merrimack. In embayments and small estuaries such as Boston Harbor, stormwater is considered the major source of PAHs. Preliminary estimates suggest that about 1000 µg per square meter per year fall onto the Bays from both wet and dry deposition. In urban areas, most of the

2nd National Sediment Inventory Workshop a Success!

A very successful second National Workshop on the National Sediment Inventory (NSI) was held on April 26-27 in Washington, DC. Sixty-three sediment quality experts from EPA Headquarters, Regions, and laboratories; other federal agencies; states; and private consulting firms were in attendance. The purpose of the 2-day meeting was to finalize the approach to be used in evaluating NSI data in order to identify and group categories of known and suspected contaminated sediment sites of concern.

The Workshop began with opening remarks from Betsy Southerland, Chief of the Risk Assessment and Management Branch of EPA's Office of Water. She challenged the group with the charge of identifying a method for evaluating the chemical and biological data contained in the NSI and deriving a "weight-of-evidence" approach for combining this information to identify and rank both known and suspected contaminated sediment sites of concern. These sites will be used for many purposes, including further assessment, source control, and pollution prevention, as described in the National Contaminated Sediment Management Strategy. The information will also be used in a Report to Congress in 1995.

Next, Catherine Fox of EPA presented an overview on data contained in the NSI (sediment chemistry, tissue residue, toxicity, benthic abundance, QA/QC, point source releases, location, sampling date, and contact). She also presented the results of a preliminary evaluation of NSI sediment chemistry data performed by Drew Zacherle and Jon Harcum of Tetra Tech. Peter Chapman of EVS gave a presentation on potential methodologies for use in evaluating specific data types. The full session met again to reach a consensus on categories of sites for estimating potential risks from contaminated sediments based on types and quality of NSI data. The workshop also stimulated many interesting discussions on future research initatives involving the use of NSI data. Attendees of the workshop then broke up into workgroups to begin discussions of methodology selection. The three workgroups were headed by Chris Ingersoll (NBS) and Allen Burton (Wright State University); Rick Swartz (EPA, Corvallis) and Peter Chapman (EVS); and Gary Ankley (EPA, Duluth) and John Scott (SAIC).

The second day of the NSI Workshop began with an update from Betsy Southerland on progress made and an identification of issues remaining. Peter Chapman followed with a presentation on existing "weight-of-evidence" approaches and suggested his approach for evaluating the NSI data. Again, the workgroups met to continue developing an approach for the NSI data. Workgroup leaders were instrumental in helping to derive the final approach for interpreting the NSI. Their assistance, as well as that of all others who participated in the Workshop, is very much appreciated!

To receive copies of the proceedings from the National Sediment Inventory Workshop, contact Catherine Fox, EPA OST, at (202) 260-1327.

PAHs are found in dry deposition. Sediments are considered the long-term repository of most contaminants. PAHs from the atmosphere will likely accumulate in depositional areas in the Bays such as in Stellwagen Basin or, as recent evidence suggests, in the deepest part of Cape Cod Bay. In Boston Harbor, stormwater-derived PAHs may accumulate in depositional areas such as Quincy Bay, Dorchester Bay, and Fort Point Channel, which experiences a phenomenal 6 cm/year. (Average accumulation rates in Boston Harbor are less than 1 cm/yr.) Depending on the assumptions used, it is estimated that if no further accumulation of sediments occurred and discharges of PAHs ceased, several hundred kilograms of pyrene can be expected to be released to the overlying water on an annual basis. This would make the sediments the largest source of contaminants to the Boston Harbor water column!

But, how are important living resources affected by contaminants? Transfer of chlorinated organic compounds (e.g., polychlorinated biphenyls (PCBs) and DDT) through the food chain is relatively well understood because these compounds tend to bioaccumulate. However, many PAHs are readily transformed to breakdown products, called metabolites, which may be just as harmful as parent compounds. A comparison of the uptake and metabolism of certain PAHs in three species of polychaetes *(Scolecolepides viridis, Nereis diversicolor*, and *Leitoscolopolis fragilis*) and the clam *Mya arenaria* demonstrated a range in metabolic abilities. (These species are important dietary components of winter flounder and other secondary consumers.) *N. diversicolor* metabolized benzo(a)pyrene very effectively, indicating it may not be useful in bioaccumulation tests. Also, measurements of body burdens in animals capable of metabolizing PAHs, such as polychaetes or fish, do not adequately describe the actual risk to an organism. *S. viridis* rapidly metabolized PAHs; within days of ingestion of contaminated sediments, metabolites accounted for more than 50 percent of the body burden in the worm. These results have implications for monitoring effects of contaminants on living resources and for modeling transfer of contaminants up food chains.

To assess the health of living resources, new techniques are needed to understand the subtle effects of exposure to contaminants. One such approach is measurement of the activity of the cytochrome P4501A. Although originally evolved to metabolize steroids, this enzyme system is involved in the metabolism of many foreign chemicals, specifically the halogenated and aromatic compounds such as PAHs, PCBs, and dioxins. The presence of cytochrome P4501A induction in tissues of animals indicates exposure to these organic chemicals. Preliminary results for the killifish (*Fundulus heteroclitus*), an important small fish inhabiting salt marshes and other coastal habitats of Massachusetts Bays, show associations between levels of contamination in sediments and cytochrome induction.

The MBP recently completed an exercise in comparative risk assessment to determine which problems pose the most risks to humans, habitats, and sustainable resources in the Bays. The results suggested that the highest risks included contaminated seafood (primarily from organic compounds), contamination of benthic habitats, alteration of wetland habitats, overfishing, and shellfish bed closures. The risk assessment confirms our focus to reduce contaminants (e.g., PAHs), entering the Bays, accumulating in sediments and ultimately in living resources and seafood. The MBP is using this information to determine the degree of chemical contamination, or exposure, in important habitats and the status of the health of living resources in the Massachusetts Bays. The results will assist the MBP in setting targets or measurable goals for reduction of pollutants to acceptable limits.

For more information, contact Dr. Matthew Liebman, USEPA Region 1, JFK Federal Building, WQE, Boston, MA 02203; (617)565-4866; Internet: bays@epamail.epa.gov

A National Forum on Mercury in Fish

EPA's Risk Assessment and Management Branch will host a national forum on mercury in fish on September 27-29, 1994, in New Orleans, Louisiana. This forum is part of EPA's ongoing effort to provide relevant and timely technical assistance to state agencies and others with an interest in fish contamination issues. The agenda will include panel presentations on toxicity and risk assessment, risk management and risk communication, mercury control strategies, and state experiences. The forum is primarily targeted toward regulatory personnel who must understand and respond to concerns about possible human health effects resulting from mercury contamination in fish tissues. Managers and staff from state and federal agencies, as well as members from the academic community, are also encouraged to attend. Due to limited space, preregistration is required. Call Charlie MacPherson, Tetra Tech, at (703) 385-6000 to obtain a meeting announcement which contains the preliminary agenda, preregistration form, and logistics information. For more information on the forum, contact Rick Hoffmann, EPA OST, at (202) 260-0642.

FOCUS:

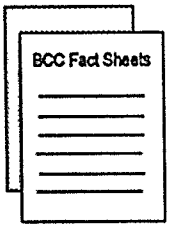
Great Lakes Toxics Reduction Effort

U.S. Environmental Protection Agency, Region 5, Water Division

EPA Region 5 hosted a Sediment Summit on February 1-3, as part of the Great Lakes Toxics Reduction Effort (Great Lakes TRE). The Great Lakes TRE was formed to focus on reducing nonpoint source (NPS) loadings of toxics to the Great Lakes, with an emphasis on the bioaccumulative chemicals of concern identified in the proposed Great Lakes Water Quality Guidance. The Great Lakes TRE uses existing programs as much as possible to reduce NPS pollutants, instead of launching separate efforts. Five major pathways of NPS pollutants into the Great Lakes were identified–CSOs/urban runoff; leaking waste sites; transport, handling, and spills; air deposition; and sediments.

The Great Lakes TRE was formed to focus on reducing nonpoint source (NPS) loadings of toxics to the Great Lakes

The Great Lakes TRE has already made significant strides toward reducing NPS pollutants into the Great Lakes Basin. User-friendly fact sheets are currently being developed on the identified bioaccumulative chemicals of concern (BCCs). These fact sheets list the current regulatory status and uses of the chemical, the physical properties and any ecological and human health effects. Workgroup meetings have taken place to address several of the pathways such as spills, transport, handling, and storage; CSO's/urban runoff, and sediments. The focus of this article is on the meeting that was held on sediments. A meeting on air deposition is planned this summer.



The purpose of the Sediment Summit was to convene members from an existing Sediment Task Force and federal and state environmental agency staff from around the Great Lakes to define a process of how to proceed on sediment issues (i.e., remediation, sediment inventories, criteria implementation) and to develop an effective outreach process involving the regulated communtiy, potentially responsible parties (PRPs), local government, and the general public.

EPA Headquarters and ORD personnel presented the status of various issues related to sediment quality criteria (SQC), such as an update on sediment quality criteria in the *Federal Register*, analysis of SQC's potential for economic impact on the COE O&M dredging program, implementation scenarios of SQC for USEPA programs, implementation of SQC in the NPDES program, and an overview of SQC methodology.

The associated states and EPA Regional offices in the Great Lakes Basin made presentations on their respective sediment programs and highlighted any new and innovative approaches to addressing contaminated sediments.

The second part of the Sediment Summit focused on discussion and formation of a workgroup to develop a methodology for determining cleanup goals. Presentations were made on cleanup efforts at several sites such as Sheboygan River Harbor and the Oconomowoc Site, approaches for deriving cleanup goals, approaches for analyzing sediment data, and the derivation of sediment quality objectives for the State of Wisconsin.

After spirited discussion, the workgroup members agreed to follow up on specific action items:

- ✔ Establishment of the Great Lakes Sediment Task Force consisting of the attendees from the Great Lakes Sediment Summit.
- ✔ Continuation of a workgroup to develop sediment cleanup goals.
- ✔ Establishment of a workgroup to meet on sediment quality criteria issues.
- ✔ Establishment of a workgroup to meet on data management/inventory/prioritization of sites.
- ✔ Establishment of a Regional/state pilot effort to pursue remediation of contaminated sediment sites.

The Task Force has already reconvened the subgroups and is making progress toward developing a cohesive approach to reducing contaminated sediments in the Great Lakes Basin. For more information on the Sediment Task Force, contact Howard Zar, USEPA Region 5, at (312) 886-1491. For information on the Great Lakes TRE, contact Barbara McLeod, Project Manager for the Great Lakes TRE, at (312) 886-3718.

Region 9

Status of the California Bay Protection and Toxic Cleanup Program

The first report has been issued on the status of the Bay Protection and Toxic Cleanup Program (BPTCP), which was established in 1989 by the California State legislature to provide new focus to the efforts of the State Water Board and Regional Water Quality Boards to identify and remediate contaminated sediments. The program so far has identified 19 known and 179 potential toxic hot spots in the seven coastal regions of California. The four major goals of the program are (1) to provide protection to existing and future beneficial uses of bay and estuarine waters; (2) to identify and characterize toxic hot spots; (3) to plan for toxic hot spot cleanup or other remedial or mitigative actions; and (4) to develop prevention and control strategies for toxic pollutants that will prevent creation of new hot spots or the perpetuation of existing hot spots. The BPTCP will help coordinate state and regional water quality efforts to develop standards, monitor sediment and water quality, plan controls, and plan site cleanup.

Accomplishments of the program include adoption of an approach for establishing sediment quality objectives, installation of a computer system for a consolidated database of information being collected to identify toxic hot spots, implementation of regional monitoring programs in each coastal region, completion of a pilot regional monitoring program for San Francisco Bay, development of draft site ranking criteria to be used for priority ranking of toxic hot spots, and implementation of a fee system supporting the program.

The definition for a toxic hot spot written in the Water Code was too imprecise for the State and Regional Water Boards to use in prioritizing the remediation of toxic hot spots since most of the California coastline could potentially be designated as a toxic hot spot under the statutory definition. Therefore, a working definition for a toxic hot spot was developed that emphasizes the separation of natural factors from the effects of pollutants, sublethal effects, bioaccumulation, quantification of the level of concern versus concentration in sediments, taking a tiered approach, and flexibility to change to incorporate new scientific findings. A weight-of-evidence approach (i.e., one that relies on a comprehensive judgment of chemical, physical, biological, toxicological, and modeling information to draw conclusions about sites) will be used to characterize toxic hot spots and rank them for remediation. Biological measurements used to define toxic hot spots may include acute lethal tests on amphipods; chronic exposure tests using growth reduction as the endpoint with the polychaete *Neanthes*; direct measures of reproductive effects using tests on elutriates prepared from sediments or histopathological examinations of organisms for morphological deformities; tests that measure exposure to contaminants by focusing on cellular or subcellular levels, such as enzyme system or genotoxicity tests; benthic community structure; and biomarker tests for enzymes in the cytochrome P450 system, stress proteins, or enzymes associated with the development of cancer. A distinction was made between techniques that measure exposure and techniques that measure adverse effects. Reference sediments will be used to apportion part of the response to physical factors of the sediment.

Many data are needed to classify a site as a known toxic hot spot, including recurrent measurements (taken on at least two sampling dates) that show significant toxicity, high levels of bioaccumulation, impairment of resident organisms, degradation of biological resources, or exceedances of water or sediment quality objectives. Sites having fewer data are potential toxic hot spots and candidates for future monitoring to confirm preliminary indications of site impairment. The draft list of 19 known toxic hot spots and 179 potential toxic hot spots identified under the program did not provide a ranking of sites, nor had any become part of a cleanup program. Toxic hot spots were assessed using rather limited existing data available on enclosed bays and estuaries. Assessments were performed on both a regional and a site-specific basis. Regional monitoring programs have been implemented to gather information for the less-characterized sites. Monitoring information will be consolidated in a database containing information pertinent to describing and managing toxic hot spots. Criteria for ranking toxic hot spots will consider (1) potential hazards to public health; (2) toxic hazards to fish, shellfish, and wildlife; and (3) the extent to which the deferral of a remedial action will result or is likely to result in a significant increase in environmental damage, health risks, or cleanup costs.

The Water Code required that each Regional Water Board complete a toxic hot spot cleanup plan by July 1993 that was to be consolidated by the State Water Board by January 1994. Each cleanup plan will include information on the known toxic hot spots covered by the plan; a description of each toxic hot spot, including a characterization of the pollutants present; an assessment of the most likely source or sources of pollutants; an estimate of the total cost to implement the cleanup plan, including the costs likely to be recovered from parties responsible for the discharge; a preliminary assessment of the actions required to remedy or restore a toxic hot spot; and a 2-year expenditure schedule identifying state funds needed to complete the plan. Funding for the BPTCP is provided by a fee system that splits the costs among all dischargers. FY 1993 was the first year that the program was funded for the preparation of Regional and Statewide Toxic Hot Spot Cleanup Plans. Regional Boards had made insignificant progress in the development of their cleanup plans by January 1, 1994, when the fee system ended. The deadlines were extended to January 1, 1998, for the regional cleanup plans and June 30, 1999, for the statewide cleanup plan. The fee program was extended to fund full implementation of the program.

A weight-of-evidence approach will be used to characterize toxic hot spots and rank them for remediation.

Copies of the *Report on the Status of the Bay Protection and Toxic Cleanup Program* can be obtained through the Office of Legislative and Public Affairs (State Water Resources Control Board, P.O. Box 100, Sacramento, CA 95812-0100), (916) 657-1247.

Region 10

Agencies Agree on Comprehensive Sediment Program

In May 1994, EPA Region 10, Seattle District Corps of Engineers, the Washington Departments of Ecology and Natural Resources, and Puget Sound Water Quality Authority agreed to establish a coordinated and cooperative sediment management program. The interagency/intergovernmental program will provide a forum for the agencies to comprehensively address clean and contaminated sediment issues across different programs and may be amended in the future to include new issues or actions. In the near term the program's focus is expected to be on development and refinement of assessment tools, pollution prevention, public outreach, technology transfer, etc. Three initial actions were identified that will be jointly pursued during the next 12 months:

- Sediment Cleanup Strategy. The agencies will attempt to develop a strategy involving a range of approaches under different authorities to achieve cleanup of contaminated sediments in the aquatic environment.
- Multiuser Confined Disposal Site(s). An action plan will be prepared that details study on other requirements leading to development of one or more multiuser confined disposal sites.
- Beneficial Use Policies. The agencies will define policies to facilitate projects involving beneficial use of dredged material and recommendations for implementation.

The program builds upon the existing Puget Sound Dredged Disposal Analysis (PSDDA), which managed open-water disposal of uncontaminated dredged material.

For more information, contact John Malek, EPA Region 10, at (206) 553-1286.

Development of a Contaminated Sediment Sites List

The Washington Department of Ecology is developing a list of contaminated sediment sites in Puget Sound. The list is, in part, a prioritization exercise that will help the agency allocate resources for sediment cleanups in the future.

The first step involves collecting and evaluating sediment data from Ecology's SEDQUAL database. SEDQUAL currently contains sediment chemical and biological information for more than 2,200 stations in Puget Sound. [These data are included in Region 10's package of information to the National Sediment Inventory—see related story.] Site identification consists of grouping adjacent sampling stations with similar types of chemical contamination into station clusters using a computer-generated algorithm. The station clusters are then evaluated to determine whether the level of contamination exceeds the chemical or biological cleanup screening levels (CSL) of the state's Sediment Management Standards (Chapter 173-204 Washington Administrative Code). If the CSLs are not exceeded, the area is not considered to warrant cleanup at this time. Any area may be re-evaluated if additional information becomes available.

Station clusters that exceed the CSLs are identified as stations of potential concern and are subjected to a hazard assessment. The hazard assessment considers information on sediment quality, physical characteristics of the immediate and surrounding environment, biological resources, and human uses of aquatic resources. The public and affected community are afforded an opportunity to provide additional data to confirm or refute Ecology's findings.

Following hazard assessment, station clusters of potential concern are further evaluated and are ranked according to their relative degree of hazard to human health and ecological factors to determine whether they should be identified as contaminated sediment sites. Results of this site identification effort will be reported in the future.

For more information, contact Rachael Freidman-Thomas, WA Department of Ecology, at (206) 407-6909, or John Malek, EPA Region 10, at (206) 553-1286.

CS News is produced by EPA OST to exchange information on contaminated sediments and to increase communication among interested parties. To obtain copies of this report or to contribute information, contact Bev Baker, EPA OST, at (202) 260-7037.

To be added to the mailing list or to make changes to your address, please fax your request to Charlie MacPherson, Tetra Tech, at (703) 385-6007.

PSDDA Sixth Annual Review Meeting

The sixth annual Puget Sound Dredged Disposal Analysis (PSDDA) review meeting was held on May 6, 1994, in Seattle, Washington. The meeting was hosted this year by EPA Region 10. A biennial report for dredging years 1992/1993 reviews sampling, testing, and disposal for PSDDA projects and site monitoring conducted at the Elliott Bay and Bellingham Bay disposal sites; limited copies of the report are still available. The status of a number of ongoing actions and minor clarifications for the program were discussed, and public comments were taken on a variety of topics. The meeting is open to the public and is usually well attended by the regional dredging community.

For more information, contact John Malek, EPA Region 10, at (206) 553-1286.

Superfund Sediment Cleanups!

Eagle Harbor Removal Action: Throughout the past winter, Region 10 and the Seattle District cooperated to cap one of Puget Sound's most infamous "hot spots." Approximately 275,000 cubic yards of clean sediments dredged by the Corps from the Snohomish River navigation channel as part of the Corps's maintenance responsibility were placed within the East Harbor unit of the Eagle Harbor Superfund site under EPA's Superfund removal authority. The hot spot contained some of

The $3 million project was the first use of capping at an underwater Superfund site in the Northwest.

Puget Sound's highest concentrations of carcinogenic, petroleum-derived chemical compounds (polynuclear aromatic hydrocarbons, PAHs). Construction began in September 1993 and was completed in March 1994. Two different placement methods were used. In the deeper central harbor, material was trickled out of bottom-dump barges. In shallower areas, high-pressure hoses washed the sediment off barge decks, allowing it to settle more gently. Even before work was finished, underwater videos showed sea anemones, sea pens, and other life beginning to recolonize the cap. The $3 million project was the first use of capping at an underwater Superfund site in the Northwest. Coordination with the Corps's maintenance dredging resulted in a savings of about $2 million to the Superfund project. Monitoring and evaluation of the cap is still ongoing.

For more information, contact Ellen Hale, Remedial Site Manager, EPA Region 10, at (206) 553-1215, or John Malek, EPA Region 10, at (206) 553-1286.

Sitcum Waterway Remediation: The dredges are temporarily quiet in Commencement Bay during the fisheries closure for work-in-water. They will roar back to life in mid-June to complete a combined Superfund cleanup and Port of Tacoma development project. The work is being performed under oversight of Region 10's Superfund program since it involves cleanup of a "problem area" in the Sitcum Waterway that was identified in EPA's Record of Decision for the Commencement Bay Nearshore/Tideflats Superfund site. However, the project, which involves dredging of an adjacent waterway (the Blair) and filling of a third waterway, (the Milwaukee), started out as a proposed permit action under §404 of the Clean Water Act.

Coordination between the Corps and EPA in 1990 suggested that the two actions could be combined, simultaneously achieving contaminated sediment cleanup as part of the Port's proposed facility development. EPA, the Corps, and the Port worked closely together in evaluating and designing the resulting project, which includes mitigation for lost aquatic habitat. Construction was initiated in October 1993 and is expected to be completed in late fall of 1994. In March 1994, the project was reviewed by the Committee on Contaminated Sediments of the National Research Council Commission on Engineering and Technical Systems (Marine Advisory Board); their report is anticipated in the near future.

For more information, contact Margaret Justus, Remedial Site Manager, EPA Region 10, at (206) 553-2138, or John Malek, EPA Region 10, at (206) 553-1286.

ORD Activities

ERL Narragansett/Newport

Seasonal Distribution of AVS

Acid volatile sulfide (AVS) was measured in sediment cores from an estuarine cove for a year to investigate vertical and seasonal variations. Data indicate a characteristic variation of AVS with depth: concentrations are lower (1-5 µmol/g) in surface sediments (0-1 cm), increase to a maximum of 25-30 µmol/g approximately 4 cm deep, and decrease with further depth to relatively constant background concentrations of 12-14 µmol/g below 10 cm. Profiles also demonstrate marked seasonal variation. Concentrations in the upper 3 cm of sediment increase rapidly during late spring and early summer, apparently in response to underlying water temperature increasing above 15°C, and continue to increase throughout summer. From late fall through late spring, AVS decreases in surface and immediately underlying sediments as oxygen diffuses into anoxic sediments, oxidizing sulfides. Subsurface AVS maxima are larger and occur closer to the surface in summer than in winter; AVS concentrations in the upper 3 cm of sediment vary 15- to 25-fold between late May and mid-August. While even lower surface sediment AVS concentrations exceed molar concentrations of divalent metals in most coastal sediments, the substantial cycling of AVS could be significant in the sequestering and release of metals in sediments with large contaminant loads. For more information contact Warren Boothman, ERL Narragansett, at (401) 782-3161.

Creature Feature Answers

a. *Dinophilus* sp.
b. *Nereis virens*
c. *Capitella capitata*
d. *Neanthes arenaceodentata*
e. *Mulinia lateralis*
f. *Macoma nasata*
g. *Leptocheirus plumulosus*
h. *Rhepoxynius abronius*
i. *Ampelisca abdita*
j. *Eohaustorius estuarius*
k. *Corophium volutator*
l. *Lumbriculus variegatus*
m. *Heliosoma* sp.
n. *Chironomus tentans*
o. *Hexagenia limbata*
p. *Hyalella azteca*
q. *Gammarus* sp.
r. *Pontoporeia hoyi*

It's Here! The 1994 International Hazardous Material Spills Conference

Buffalo, New York, is hosting the 1994 International Hazardous Material Spills Conference October 31-November 3, 1994. The Hyatt Regency Hotel and the Convention Center is the site for this bi-annual conference. Communities, state and local governments, industry, and international guests will have the opportunity to learn more about how to prevent and respond to hazardous materials accidents.

In the 10 years since the Bophal tragedy, significant strides have been made in hazardous materials safety. These positive changes resulted from proactive partnerships formed by all the vested interest groups in the private, public, and international arenas. The theme for this year's conference is Partnerships for Hazardous Materials Safety.

The conference offers the opportunity for groups with common, as well as disparate, concerns to exchange and develop ideas. In addition, state-of-the-art training on various aspects of hazardous materials safety will be provided throughout the conference. Conference attendees can influence future directions of these issues through their participation in both the large presentations and small group discussions scheduled to take place.

Considerable resources and energy are being committed to ensure the overall success of the meeting. The conference sponsors include the National Response Team, the National Governors' Association, the Chemical Manufacturers Association, and the American Institute of Chemical Engineers, in cooperation with the Canadian Chemical Producers Association and the New York State Emergency Response Commission.

If your work requires a knowledge of hazardous materials safety, this is one conference you won't want to miss. Firefighters, government officials, plant or transportation managers, and other interested parties are encouraged to attend.

Registration materials will be available in the near future. To ensure that you are on the mailing list, contact Angela Moody at (703) 442-9824. If you have questions regarding the conference, contact Sarah Bauer at (202) 260-8247.

This year's conference promises to hold your interest, provide you with the best training available in the field, and update your knowledge of hazardous materials issues. If you attend, not only will you gain greater knowledge in the subject area, but equally important, the interaction with your colleagues will renew your interest and commitment to hazardous materials safety.

U.S. Army Corps of Engineers

The Contaminants Bulletin Board

The Aquatic Contaminants Team, Fate and Effects Branch, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station has in place an electronic Bulletin Board System (BBS) for the exchange of contaminated sediment and dredged material information. The BBS is intended to be a source of information about sediment-associated chemical contaminants and a forum for discussion of contaminated sediment and dredged material problems. Several databases are available for on-line use. These database programs have been written to provide easy data access via a simple menu-driven interface.

- The Ocean Disposal Database (ODD) contains data on sediments disposed of in the ocean from all Corps of Engineers federal and permitted dredging projects. These data include location dredged, disposal site information, dates, disposal volumes, and summary chemical information for each project from 1976 to 1991. Data for the last 2 years are currently being collected.

- The Accumulation Factor (AF) Database is a collection of data collated from published scientific and grey literature in which the concentrations of organic chemicals measured in sediments and in organisms exposed to them are reported and calculated into accumulation factors. The AF Database is searchable by contaminant or by organism. Complete references are given for the entries. Specific-contaminant AFs in this database offer an alternative to the generalized AF presently suggested in Tier II theoretical bioaccumulation potential (TBP) calculations of the EPA/COE *Ocean Disposal Testing Manual* (the "Green Book").

- The Contaminants Database reports data from published scientific and grey literature on sediment and tissue residue

levels of dioxins, furans, PAHs, and PCBs. The data are searchable by contaminant, waterway, state, country, and organism name. Complete references are also provided. This database is a valuable aid for comparing contaminants data from a specific location to other areas.

The AF and Contaminants Databases are in their infancy but are continuously being enlarged and updated.

To reach the BBS, dial (601) 634-4380 with your computer modem set at 8 data bits, no parity, and 1 stop bit (N,8,1). Modem speeds up to 9600 baud are supported. You will be asked to fill out a short questionnaire the first time you call in, but access to the databases is immediately available.

The BBS and associated database development are supported by the Corps of Engineers Long Term Effects of Dredging Operations (LEDO) and Dredging Operations Technical Support (DOTS) Programs. Contact Mr. Charlie Lutz, COE, at (601) 634-2489 for further information or for assistance in accessing the BBS.

NOAA

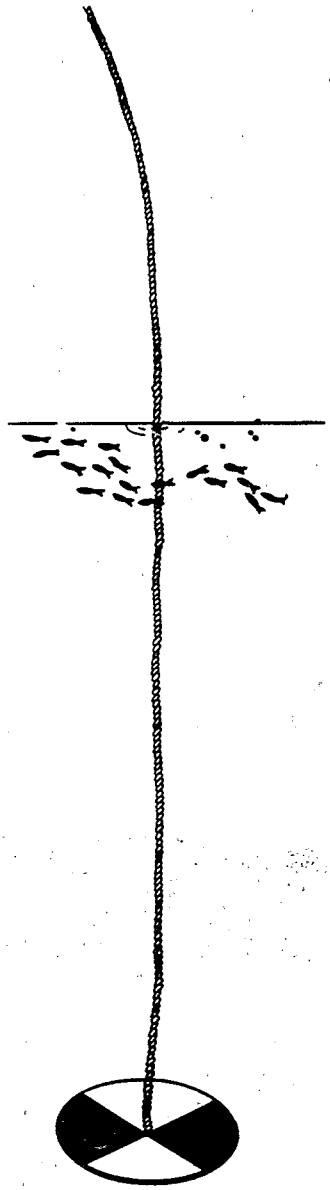
Verification of Sediment Quality Guidelines with Sediment Toxicity Tests

Numerical sediment quality guidelines for a variety of trace metals, aromatic hydrocarbons, PCBs, and pesticides were prepared by Long and Morgan (NOAA Tech. Memo. NOS OMA 52, 1990) for the National Status and Trends (NS&T) Program. These values were updated by Long and others (Environmental Management, in press) with an expanded database. In addition, MacDonald (report to Florida Dept. Envir. Prot., 1994) prepared guidelines for Florida, using a modified approach similar to that of Long and Morgan (1990).

The ERM (Effects Range-Median) values of Long et al. (in press) and the PEL (Probable Effects Level) values of MacDonald (1994) were intended to represent the concentrations above which effects frequently occurred in previous studies. The incidence of biological effects at chemical concentrations above the ERM values and the PEL values were quantified in the respective reports, using the data compiled to calculate the guidelines.

Verification of the predictability of toxicity by the guidelines has begun, using independent data sets from regional NS&T Program field surveys. Results acquired thus far are summarized in the accompanying table. Matching chemical and toxicity data are available from surveys of San Pedro Bay in which two toxicity tests were performed; the Hudson-Raritan estuary (four tests); and two successive surveys of Tampa Bay (two or three tests). Toxicity in any one of the tests was predicted if the concentration(s) of one (or more) chemicals equaled or exceeded the respective ERM or PEL values.

The agreement between the number of samples that were predicted to be toxic and the proportion of those samples that actually were toxic is shown as percent agreement. Agreement between predicted and actual toxicity ranged from 75% to 100%. Overall, 90% and 86% of the samples predicted to be toxic by the ERMs and the PELs, respectively, actually were toxic in any one test. Additional data from Long Island Sound (not shown) indicate that 18 of 19 samples predicted by the ERMs to be toxic actually were toxic (95% agreement). For more information contact Ed Long, NOAA/ORCA, at (206) 526-6338.



Summary: Overall Agreement Between Predicted and Actual Toxicity in Any Test

	≥ 1 ERM Exceeded		≥ 1 PEL Exceeded	
San Pedro Bay	37/38	(97%)	34/36	(94%)
Hudson-Raritan estuary	24/32	(75%)	26/34	(76%)
Tampa Bay I	10/10	(100%)	9/9	(100%)
Tampa Bay II	15/16	(94%)	31/37	(83%)
Combined Totals	85/96	(90%)	100/116	(83%)

ASTM UPDATE

The ASTM Subcommittee E47.03 met in Montreal Quebec April 12th, 1994 during the annual ASTM symposium.

A. Results were discussed during the Subcommittee meeting for a:

1. Concurrent Subcommittee and Main Committee ballot:

   a. Revision to E1383-94 (freshwater invertebrate toxicity: Annex 6 on *Tubifex tubifex*): passed with editorial revision, ready for Society ballot.

   b. Revision to E1383-94 (freshwater invertebrate toxicity: Annex 7 on *Diporeia sp.*): passed with editorial revision, ready for Society ballot.

   c. Revision to E1525-93 (Sediment design: Annex 2 on sediment resuspension): passed with editorial revision, ready for Society ballot.

   d. Luminescent bacteria testing: Negatives persuasive. The Task Group recommends additional testing before this proposed standard is re-balloted.

   e. Revision to E1383-94 (freshwater invertebrate toxicity: Toxicity test methods and guidance on bioaccumulation): Negatives persuasive. The Task Group will revise the document and re-ballot concurrently this summer. The primary modification will be to separate toxicity and bioaccumulation methods into individual standards.

   f. Revision to E1391-90 (sediment collection, storage and manipulation): passed with editorial revision, ready for Society ballot:

   g. Earthworm testing: passed with editorial revision, ready for Society ballot.

2. Society ballot:

   a. Revision to E1383-93 (Annex A5 on mayflies): passed in January 1994.

   b. Revision to E1525-93 (sediment design): on March 1994 ballot.

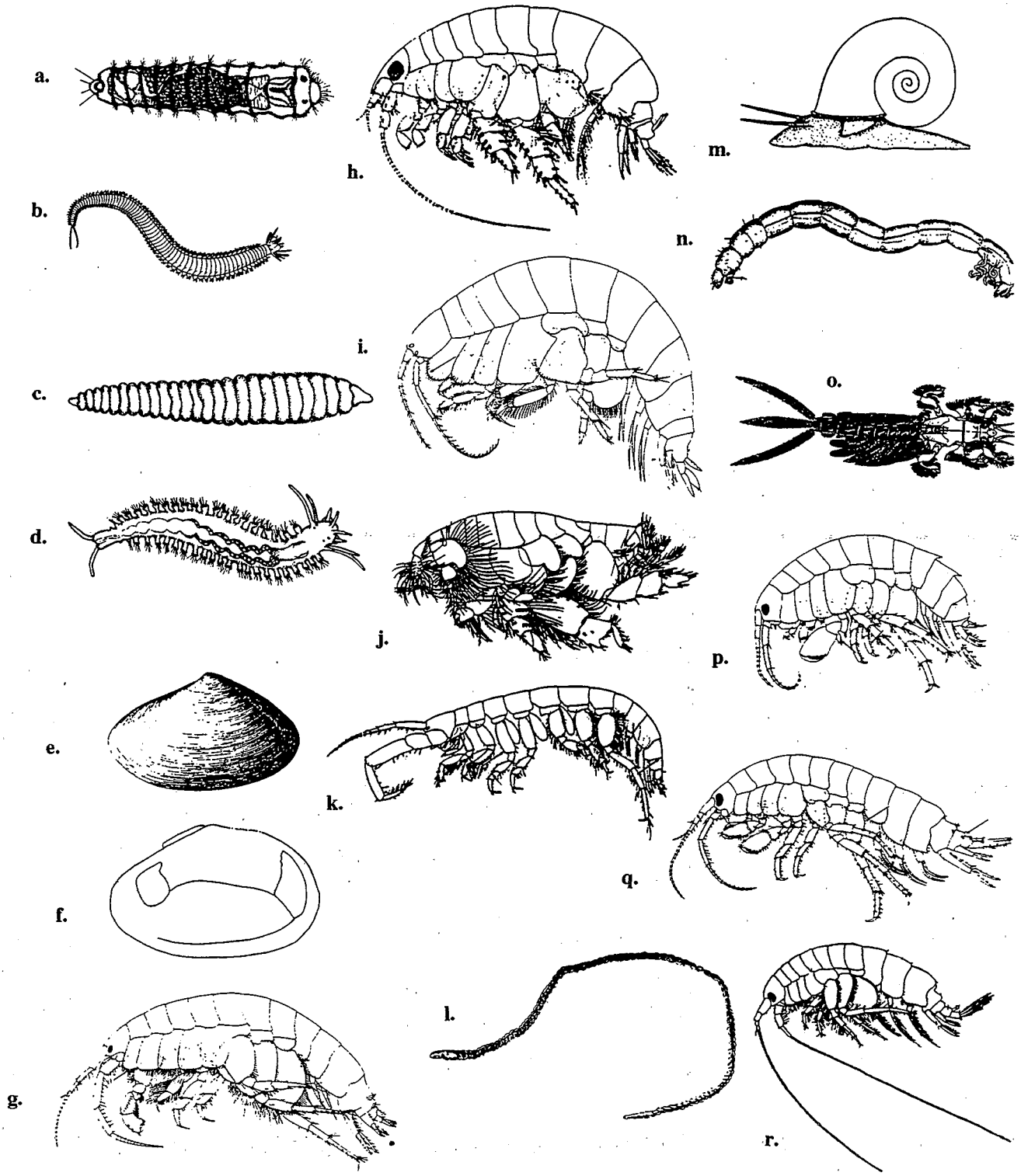
   c. E1611 (polychaete testing): on April 1994 ballot.

B. There were no actions since the last Subcommittee meeting on: (1) Sediment Toxicity Tests with Oysters; (2) Sediment Toxicity Tests with Echinoderms; (3) Bioaccumulation of Sediment-Associated Contaminants by Benthic Invertebrates; (4) Bioaccumulation of Sediment-Associated Contaminants by Fish (z2227z); (5) Revision to E1367-92 (marine and estuarine amphipod toxicity); (6) Revision to E1525-93 (sediment design): Annex 1 on Statistical Guidance; (7) Revision to E1525-93 (sediment design): Annex 3 on Reference Toxicant Testing.

The next Subcommittee meeting will be held before the annual SETAC meeting Saturday, October 29, 1994 (A.M. and P.M.) at the Hyatt Regency in Denver, CO. Please contact Chris Ingersoll (314/875-5399; FAX 314/876-1896) if you would like more information concerning the Subcommittee meeting or if you would like more information on activities of the Subcommittee. Please contact the Task Group Chairs if you would like a copy of the most recent draft of the documents or if you would like to participate on a Task Group. Thanks for your time and anticipated input. We hope to see you in Denver.

CREATURE FEATURE: *We could just DIE for you.*

Test out Dave Hansen's quiz to see how well you know your tox test critters. Answers on page 7.



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